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PTO/SB/21 (09-04)

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

43

Application Number

09/275,568

Filing Date

March 24, 1999

First Named Inventor

Michael C. Pitman

Art Unit

2163

Examiner Name

Ly, Cheyne D.

Attorney Docket Number

YOR919980112US1

ENCLOSURES (Check all that apply)



Fee Transmittal Form



Fee Attached



Amendment/Reply



After Final



Affidavits/declaration(s)



Extension of Time Request



Express Abandonment Request



Information Disclosure Statement



Certified Copy of Priority Document(s)



Reply to Missing Parts/
Incomplete Application



Reply to Missing Parts
under 37 CFR 1.52 or 1.53



Drawing(s)



Licensing-related Papers



Petition



Petition to Convert to a
Provisional Application



Power of Attorney, Revocation
Change of Correspondence Address



Terminal Disclaimer



Request for Refund



CD, Number of CD(s) _____

☐ Landscape Table on CD



After Allowance Communication to TC



Appeal Communication to Board
of Appeals and Interferences



Appeal Communication to TC
(Appeal Notice, Brief, Reply Brief)



Proprietary Information



Status Letter



Other Enclosure(s) (please identify
below):

Postcard

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name

Holland + Knight LLP

Signature

Michael J. Buchenhorner

Printed name

Michael J. Buchenhorner

Date

12/05/2005

Reg. No.

33,162

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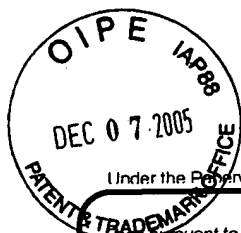
Michael J. Buchenhorner

Date

12/05/2005

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PTO/SB/17 (12-04v2)

Approved for use through 07/31/2006. OMB 0651-0032

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Effective on 12/08/2004.

Pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL

For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500.00

Complete if Known

| | |
|----------------------|-------------------|
| Application Number | 09/275,568 |
| Filing Date | 3/24/1999 |
| First Named Inventor | Michael C. Pitman |
| Examiner Name | Ly, Cheyne D. |
| Art Unit | 2163 |
| Attorney Docket No. | YOR919980112US1 |

METHOD OF PAYMENT (check all that apply)☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____☒ Deposit Account Deposit Account Number: **50-0510** Deposit Account Name: **IBM T.J. Thomas Rsrch Cnt**

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below☒ Charge fee(s) indicated below, except for the filing fee☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17☐ Credit any overpayments**WARNING:** Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

| Application Type | FILING FEES | | SEARCH FEES | | EXAMINATION FEES | | Fees Paid (\$) |
|------------------|-------------|-----------------------|-------------|-----------------------|------------------|-----------------------|----------------|
| | Fee (\$) | Small Entity Fee (\$) | Fee (\$) | Small Entity Fee (\$) | Fee (\$) | Small Entity Fee (\$) | |
| Utility | 300 | 150 | 500 | 250 | 200 | 100 | |
| Design | 200 | 100 | 100 | 50 | 130 | 65 | |
| Plant | 200 | 100 | 300 | 150 | 160 | 80 | |
| Reissue | 300 | 150 | 500 | 250 | 600 | 300 | |
| Provisional | 200 | 100 | 0 | 0 | 0 | 0 | |

2. EXCESS CLAIM FEES**Fee Description**

Each claim over 20 (including Reissues)

| Fee (\$) | Small Entity Fee (\$) |
|----------|-----------------------|
| 50 | 25 |

Each independent claim over 3 (including Reissues)

200

Multiple dependent claims

360

| Total Claims | Extra Claims | Fee (\$) | Fee Paid (\$) |
|--------------|--------------|----------|---------------|
|--------------|--------------|----------|---------------|

- 20 or HP = _____ x _____ = _____

HP = highest number of total claims paid for, if greater than 20.

| Indep. Claims | Extra Claims | Fee (\$) | Fee Paid (\$) |
|---------------|--------------|----------|---------------|
|---------------|--------------|----------|---------------|

- 3 or HP = _____ x _____ = _____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims

| Fee (\$) | Fee Paid (\$) |
|----------|---------------|
|----------|---------------|

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

| Total Sheets | Extra Sheets | Number of each additional 50 or fraction thereof | Fee (\$) | Fee Paid (\$) |
|--------------|--------------|--|----------|---------------|
|--------------|--------------|--|----------|---------------|

- 100 = _____ / 50 = _____ (round up to a whole number) x _____ = _____

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Fees Paid (\$)

Other (e.g., late filing surcharge): Brief on Appeal

500.00

SUBMITTED BY

| | | | |
|-------------------|--------------------------------|--|------------------------|
| Signature | <i>Michael J. Buchenheimer</i> | Registration No. (Attorney/Agent) 33,162 | Telephone 305-789-7773 |
| Name (Print/Type) | Michael J. Buchenheimer | | Date 12/05/2005 |

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Michael C. Pitman
Serial No. : 09/275,568
Filed : March 24, 1999
Title : Similarity Searching of Molecules Based Upon Descriptor Vectors
Characterizing Molecular Regions

Art Unit : 2163
Examiner : Ly, Cheyenne D.

Mail Stop Appeal Brief - Patents

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF ON APPEAL

(1) Real Party in Interest

International Business Machines Corp.

(2) Related Appeals and Interferences

None known.

(3) Status of Claims

Claims 1, 4-15, and 31-35 are pending in the case. (See Appendix of Claims.) Claims 1, 4-15, and 31-35 were rejected. All of the pending claims are being appealed.

(4) Status of Amendments

No substantive amendments have been made since the final office action dated June 29, 2005.

CERTIFICATE OF MAILING BY FIRST CLASS MAIL

I hereby certify under 37 CFR §1.8(a) that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage on the date indicated below and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Michael J. Buchenhorner

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(5) Summary of Claimed Subject Matter

Claim 1 of the application at issue is directed to a method in a data processing system (page 5, line 12, data processing system 100 in Fig. 1(A)) for generating and storing in a database an entry, the method comprising the steps of:

generating an entry comprising: i) data identifying a molecule; ii) data identifying at least one region in the molecule; and iii) a set of axes derived from property distribution information of the at least one region, the set of axes characterizing the at least one region [page 3, lines 14-24 and page 4, lines 1-8];

generating at least one descriptor vector for the at least one region [page 6, lines 7-17];

applying a mapping to the at least one descriptor vector associated with the at least one region to construct a key based on preselected association criteria [page 4, lines 7-9]; and

storing the entry in a memory, wherein the key is associated with the entry such that the key indexes the entry for retrieval thereof [page 4, lines 1-3]. All of the other claims are dependent on claim 1 and for purposes of this appeal only are not discussed separately for purposes of anticipation.

(6) Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection to be reviewed on appeal is:

1. Did the examiner properly object to the amendment filed September 14, 2004 because it introduced new matter into the invention?
2. Did the examiner properly reject claims 8, 9, and 12-14 under 35 U.S.C. §112, second paragraph as being indefinite?
3. Did the examiner properly reject claims 1, 14-15, and 31-35 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement?
4. Did the examiner properly reject claims 1, 4-15, and 31-35 under 35 U.S.C. §101 as being directed non-statutory subject matter?
5. Did the examiner properly reject claims 1, 4, and 5 under 35 U.S.C. §102(e) as having been anticipated by Platt et al. et al. (U.S. Patent 5,784,294A)?

(7) Argument

(a) The examiner did not properly object to the amendment filed September 14, 2004 because it introduced new matter into the invention.

The specification at page 1, lines 6-8 read: "The present application claims priority to U.S. Provisional Patent Application No. 06/079,196, and is related to U.S. Patent applications (Attorney Docket YOR999-149) and (Attorney Docket No. YOR999-150), herein incorporated by reference in their entirety." In the Amendment dated September 10, 2005 the paragraph was amended to delete the reference to the provisional and to substitute the patent numbers. That amendment read:

"The present application is related to U.S. Patent No. 6,408,321 (formerly Attorney Docket No. YO999-149), entitled "Method and Apparatus for Mapping Components of Descriptor Vectors to a Space That Discriminates Between Groups," and U.S. Patent No. 6,349,265 (formerly Attorney Docket No. YO999-150), entitled "Method and Apparatus for Mapping Components of Descriptor Vectors for Molecular Complexes to a Space That Discriminates Between Groups," which are herein incorporated by reference in their entirety."

Apparently, the examiner has objected to the amendment on grounds that the phrase "which are herein incorporated by reference in their entirety" referred only to the Provisional Patent Application. That objection ignores that the language at issue uses the word "their" in reference to what is being incorporated by reference. If the Appellant meant to incorporate only the Provisional Patent it would have used "its." Moreover, the foregoing language refers to everything before it and not just the provisional and because it claims priority to the Provisional the incorporation by reference would be surplus under the examiner's interpretation. Clearly, the examiner erred in interpreting the incorporation by reference not to apply to the cited patent applications and should be reversed.

(b) The examiner improperly rejected claims 8, 9, and 12-14 under 35 U.S.C. §112, second paragraph as being indefinite.

With respect to claim 8, the examiner contended that the function " \hat{w}^T " on grounds that it "causes the claim to be because the claim is indefinite as to what parameters are represented by the variable " \hat{w}^T " in solving for $f(\hat{w})$ ". Claim 8 is set forth below:

The method of claim 7, wherein the criterion function has the general form:

$$f(\hat{w}) = C \left(\frac{\hat{w}^T \epsilon_b \hat{w}}{\hat{w}^T \epsilon_w \hat{w}} \right)$$

where \hat{w} is some vector, T indicates a transpose, ϵ_b is a first data representing covariance, ϵ_w is a second data representing covariance and C is a constant based upon degrees of freedom in ϵ_b and ϵ_w .

Clearly, the equation is for the value of the function of vector \hat{w} . The T superscript is defined as the transpose of the vector and \hat{w} is the independent variable that is "plugged in" to the equation. The examiner also complains that the words "based upon" renders the claim indefinite. The meaning of based upon is notoriously well known to those skilled in the art. It means that the constant (not variable) C is calculated on the degrees of freedom as stated in the equation.

At no time is the function $f(w)$ "solved for." Claim 8 DEFINES the function $f(w)$. In claim 10, the value of "w", the argument of $f()$ is solved for. Given the epsilons provided in claim 7, $f(w)$ is completely defined unambiguously in claim 8, for each unit vector w provided as an argument. Please note that "...C is calculated on the degrees of freedom as stated in the equation in claim 9.

As to claim 12, the claim was rejected because the word "represents." As argued below, the "represents" is to "take the place of in some respect." See Webster's New Collegiate Dictionary, G. & C. Merriam Co. (1979). The word "represent" is best identified in the definition of "variable" (from Websters dictionary online):

Main Entry: ²variable

Function: *noun*

1 a : a quantity that may assume any one of a set of values

b : a symbol *representing* a variable

2 : something that is variable

The final office action argues that "the instant claim does not define the metes and bounds of what is meant by the phrase [sic, word] "represents." The word represents is a common word in the English language and its meaning is well known to those skilled in the art. There is no need to specifically place metes and bounds in every word in a claim. The final office action misunderstands the argument made in the amendment dated September 10, 2005 and thus states: "Applicant's argument is not persuasive because "x" is not present in claims 8, 9, or 12. The argument gave an example using "x" as an example of a term that "represents" something else in mathematics.

electrical signals represented by changes in the electron distribution in the depletion layers within physical semiconductive devices, storage of information represented by the re-alignment of magnetic domains on a physical hard drive in a manner suitable for rapid recognition. Recognition is defined by Websters online as:

Main Entry: rec·og·ni·tion

Pronunciation: "re-kig-'ni-sh&n, -k&g-

Function: noun

Etymology: Middle English recognicion, from Latin recognition-, recognitio, from recognoscere

1 : the action of recognizing : the state of being recognized : as a :

ACKNOWLEDGMENT; especially : formal acknowledgment of the political existence of a government or nation **b** : knowledge or feeling that someone or something present has been encountered before

2 : special notice or attention

3 : the sensing and encoding of printed or written data by a machine <optical character recognition> <magnetic ink character recognition>

Its retrievability (recognition) depends on the method of storage. The value of stored data is in the organization of the data so that it can be usefully retrieved. If you store all of the bits in random order, you cannot retrieve any useful information. Therefore, organization of stored information is itself a step in any retrieval and recognition process.

This rejection must be reversed.

(c) The examiner improperly rejected claims 1, 14-15, and 31-35 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement.

The Examiner rejected claims 1 and 4-15 under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor at the time the application was filed has possession of the invention. The Examiner maintained his rejection of claims 1 and 4-15 under 35 U.S.C. §112, first paragraph, as outlined in the previous Office Action of January 27, 2003.

The final Office Action rejected claims 1 and 4, under 35 U.S.C. § 112, first paragraph, as containing subject matter that was not described in the original specification as to convey to one skilled in the art that the inventor possessed the claimed invention. The examiner (or the Board, if the Board is the first body to raise a particular ground for rejection) "bears the initial burden . . . of presenting a prima facie case of unpatentability. " In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Insofar as the written description requirement is concerned, that burden is discharged by "presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims." In re Wertheim, 541 F.2d 257, 263, 191 USPQ 90, 97 (CCPA 1976). Thus, the burden placed on the examiner varies, depending upon what the applicant claims. The specification contains a description of the claimed invention, albeit not in *ipsis verbis* (in the identical words), then the examiner or Board, in order to meet the burden of proof, must provide reasons why one of ordinary skill in the art would not consider the description sufficient. Id. at 264, 191 USPQ at

98. In the present case, the amendment of November 13, 2002, amended claim 1 so that the step of applying a mapping to the descriptor vector is based on pre-selected criteria. Support for the amendment does not have to be *ipsis verbis*. It is inherent from the discussion in page 40 of the specification that the application of the mapping is based on pre-determined criteria. Note that the discussion (page 40) of the "association criteria" is defined in the prior training phase and thus clearly the association criteria were "pre-determined."

Claim 1 was further amended to state that "the key indexes the entry for retrieval thereof." It is inherent in the claimed invention that the key indexes the entry for retrieval of the entry. Why else would a key corresponding to a mapping be used? In any case, the gist of the written description requirement is to prevent an applicant from adding claims to subject matter that the inventor did not possess at the time of filing. Vas-Cath Inc., v. Mahurkar, 935 F.2d 1555, 19 USPQ2d 111 (Fed. Cir. 1991). As appellants noted in the amendment of November 13, 2002, the amendment was not made to define additional subject matter but to make clear what was already implicit. Applicant again poses the question – why would information be stored if not for retrieval thereof? Moreover, the specification clearly contemplates that the key for the query region be used for data retrieval. See Page 3, line 24- page 4, lines 1-4.

The Examiner has not shown any reason why the language added in the amendment would not be supported by the specification and in fact appellants contend that the amendment was not made for purposes of patentability, so the invention defined by the claims both before and after the amendment are the same and hence was clearly in the possession of the inventor at the time of the filing of the application. Therefore, appellants request reversal of this rejection.

(d) The examiner improperly rejected claims 1, 4-15, and 31-35 under 35 U.S.C. §101 as allegedly being directed non-statutory subject matter.

The Examiner erred in rejecting the claims at issue under 35 U.S.C. §101 on grounds that the claimed invention is allegedly directed to non-statutory subject matter. The basis for the rejection is that the rejected claims "are directed to a method comprising steps without any physical alteration step." See Final Office Action at page 7.

The analysis of whether a claim is directed to statutory subject matter begins with the language of 35 U.S.C. 101, which reads:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title."

In AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352, 50 USPQ2d 1447 (Fed. Cir. 1999), the United States Court of Appeals for the Federal Circuit said that the Supreme Court has construed 101 broadly, noting that Congress intended statutory subject matter to "include anything under the sun that is made by man." See Diamond v. Chakrabarty, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 82-1979, at 5 (1952); H.R. Rep. No. 82-1923, at 6 (1952)); see also Diamond v. Diehr, 450 U.S. 175, 182 (1981). Notwithstanding the broad scope statutory subject matter, the Court has specifically identified three categories of unpatentable subject matter: "laws of nature, natural phenomena, and abstract ideas." See Diehr, 450 U.S. at 185.

In this appeal, all of the claims at issue are method claims performed in a data processing system which fall within the "process" category of the four enumerated categories of patentable subject matter in 101. The method does not fall within the law of nature, physical phenomena or an abstract idea, the recognized exceptions to date to section 101. The examiner determined that the claims at issue recite a method that "is merely arranging the data based on an algorithm without any practical application." The Examiner acknowledges that "the instant invention comprises steps for manipulating said data." See Final Office Action at page 7. However, attempts to create another exception to section 101: no physical alteration (citing MPEP §2106, IV, B, 2,(b)ii) (titled "Computer-Related Processes Limited to a Practical Application in the Technological Arts. The Board recently reversed a rejection under section 101 based on this so-called "technological arts" exception, and held that the Board declines to enter a new ground of rejection and reversed. In re Lundgren, Appeal No. 2003-2088 (2005). This case is almost identical except for the Examiner's semantical device of calling the claims as not performing any physical step (notwithstanding the concession that the method claims manipulate data). Assuming *arguendo* that there were an exemption for those claims that do not recite physical steps, the manipulation of data is a physical step. This rejection must be rejected as not falling within any of the exceptions to patentability.

The subject patent application claims methods or processes for generating and storing data. Moreover these processes are performed by a machine (a data processing system). The

data are expressed and processed as electrical signals operated upon by a processing apparatus. That is a practical application of the invention. The claim also states in the storing step that the key is associated with the subject data entry for retrieval thereof.

The Examiner's determination constitutes an error of law. The issue of failure to claim statutory subject matter is one of law that is reviewed de novo. See AT&T Corp. v. Excel Communications, Inc., *supra*.

The storage of data in a computer memory is by itself a concrete and useful result. Claim 1 which is representative includes four steps that precisely set forth how the subject information is stored in memory. In In re Lowry, 32 F. 3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994), the Federal Circuit held that claims directed to an invention related to "storage, use, and management of information residing in a memory were entitled to patentable weight." In Lowry, the Board of Patent Appeals and Interferences reversed the statutory subject matter rejections made by the Examiner under 35 U.S.C. §101. The Federal Circuit then went further by holding that claim limitations relating to the storage of information in a computer memory are entitled to patentable weight in distinguishing the prior art. The method claimed in the instant application is similar to the storage of data in Lowry. Storage of information in a computer memory is an important aspect of information technologies because information processing apparatus must read data from computer memory to execute operations on that information. Considering the claims at issue as a whole, as they must be, it becomes clear that the information stored in a memory has a practical purpose beyond the mere storage of the information – retrieval of the stored information based on the key mapped to a descriptor vector. The ability to retrieve information from memory based on various criteria is perhaps as important as storage of the information.

The technology of search engines which is the subject of numerous patents is concerned with this very concept. Failure to provide patent protection to inventions in the art of data retrieval would violate the constitutional mandate of promoting the progress of science and the useful arts. Therefore, the rejection of the claims at issue for failure to recite statutory subject matter must be reversed.

In the final office action dated January 27, 2003, the Examiner rejected appellants' arguments and reasserted the position that the claims are directed to unpatentable subject matter.

The Examiner thus contended that: "An invention where a system merely stores data such as descriptor vectors associated with a plurality of regions of molecules onto a media [sic, medium] is considered to be non-statutory subject matter because the said data is considered to be nonfunctional descriptive material." This rejection is nothing more than an application of the "printed matter" category of non-patentable subject matter that was so clearly discredited and reversed in the In re Lowry decision. As noted above, the general rule of patentable subject matter is expansive and any determination of failure to claim statutory subject matter must find its support in the case law. In the final office action the Examiner concedes that the claimed invention does not lack utility under section 101 of the patent statute. Therefore, the rejection is either based on the printed matter exception or on the algorithm exception to the rule of patentability. As noted above, storage of data (which is by its nature descriptive) is a very important aspect of the information technology arts. That fact was recognized in In re Lowry when the Federal Circuit laid to rest the doctrine of printed matter as applied to data stored in computer readable media. The Federal Circuit's decision in In re Lowry requires reversal of the Examiner's determination of failure to claim statutory subject matter.

To the extent that the Examiner's section 101 rejection relied on the mathematical algorithm doctrine it must also be reversed. In AT&T, supra, the Federal Circuit said that any step-by-step process involves an algorithm in the broad sense of the word. The AT&T court thus said: "Since the process of manipulation of numbers is a fundamental part of computer technology, we have had to reexamine the rules that govern the patentability of such technology. The sea-changes in both law and technology stand as a testament to the ability of law to adapt to new and innovative concepts, while remaining true to basic principles." AT&T, 172 F.3d at 1356. Thus the AT&T court limited the "Algorithm" doctrine to apply only in cases of purely "abstract" algorithms. See AT&T at 1357. In AT&T, the Federal Circuit also said that the algorithm must be applied in a useful way and found a practical result in the claimed methods in the addition of certain descriptive information called a PIC (or primary interchange carrier) to certain other information used in switching telephone calls. The information in the claims at issue in the instant case also has a useful result – the storage for retrieval of information from a computer memory responsive to a search for certain criteria. The retrieved information is useful for, among other purposes, determining properties of molecules.

The Examiner's argument that the information stored according to the claims at issue is merely descriptive if applied to the field of photography would preclude the patentability of cameras because cameras take light, one form of information that represents an object, and record the information in film. The information is merely descriptive of the subject of the photograph. The application of the Examiner's reasoning to the clearly patentable area of photograph illustrates the point that the claimed invention which is analogous to other forms of data storage should not be precluded from patentability.

The Federal Circuit rejected an argument similar to the Examiner's Arrhythmia Research Technology, Inc. v. Corazonix Corp., 22 USPQ2d 1033 (Fed. Cir. 1992), where processing information describing a patient's heartbeat was held to be statutory subject matter. The court there said that the claims at issue did not preempt all uses of the algorithm, Arrhythmia at 1060. Similarly, in the instant case the claims do not preempt all uses of any algorithms; rather they are limited to storage and retrieval in a computer memory. Therefore, appellants request reversal of the rejection of the claims at issue under 35 U.S.C. §101.

Electrical signals represented by changes in the electron distribution in the depletion layers within physical semiconductive devices, storage of information represented by the re-alignment of magnetic domains on a physical hard drive in a manner suitable for rapid recognition. Recognition is defined by Websters online as:

Main Entry: rec·og·ni·tion

Pronunciation: "re-kig-'ni-sh&n, -k&g-

Function: noun

Etymology: Middle English recognicion, from Latin recognition-, recognitio, from recognoscere

1 : the action of recognizing : the state of being recognized : as a :
ACKNOWLEDGMENT; especially : formal acknowledgment of the political existence of a government or nation b : knowledge or feeling that someone or something present has been encountered before

2 : special notice or attention

3 : the sensing and encoding of printed or written data by a machine <optical character recognition> <magnetic ink character recognition>

Its retrievability (recognition) depends on the method of storage. The value of stored data is in the organization of the data so that it can be usefully retrieved. If you store all of the bits in random order, you cannot retrieve any useful information. Therefore, organization of stored information is itself a step in any retrieval and recognition process.

(e) The examiner did not properly reject claims 1, 4, and 5 under 35 U.S.C. §102(e) as having been anticipated by Platt et al.

For a reference to anticipate a claim, each element and limitation of the claim must be found in the reference. Hoover Group, Inc. v. Custom Metalcraft, Inc., 66 F.3d 299, 302 (Fed. Cir. 1995). Claims 1, 4, and 5 were rejected under 35 U.S.C. § 102(e)(2) as being anticipated by Platt (U.S. Pat. No. 5,784,294). Platt does not disclose all of the elements of the claims and therefore does not anticipate it. For reference, a copy of Platt is provided in the appendix.

This rejection should be reversed because the Examiner has not shown that claim 1 is anticipated by Platt. Nowhere does Platt teach or disclose *any* of the elements of claim 1. Platt relates to a storage device that performs a plurality of functions that produce a result that can be an input to the method of claim 1 of the instant application but which does not anticipate the claims at issue. Platt does not disclose the required mapping, generation of a key, or string the entry as required by claim 1.

In the final office action, the Examiner contends that Platt discloses at Fig. 9 "storing an entry comprising a molecular descriptor with a key to access it." Fig. 9 of Platt is a flow chart illustrating use of descriptors. It does not relate to a mapping of descriptor vectors (as claimed) at all. The key generated according to claim 1 corresponds to the mapping. The Examiner has not shown how Fig. 9 of Platt performs a mapping or any of the claimed steps.

The Examiner further says "Platt et al. teaches storing said first and second descriptors of each molecule in said series of molecules in a database for subsequent processing to thereby identify correspondence between molecules in said series of molecules (Claim 34, Lines 39-42)." That statement does not describe any of the claimed steps. The claimed step of "storing" relates

to the entry defined in the first step. The section of Pratt cited has nothing to do with such an entry and hence cannot correspond to the claimed storing step, or any other claimed step.

The Examiner also argues that the "key" is inherent. Again, the claimed "key" corresponds to the claimed mapping and the Examiner has not shown anything in Platt corresponding to such a mapping. Instead, the Examiner argues that Platt has some criteria for selecting molecules of the training set to be placed in a table and that this corresponds to "applying the mapping." The Examiner does not show how the placement of molecules in a table relates even remotely to applying a mapping to a descriptor vector as claimed and has fallen far short of the exact relationship that anticipation requires.

Specifically, claims made in the Platt CoMMA patent that involved construction of axes and descriptor vectors applied to mass, unweighted point set distributions, and charge distributions. The instant patent application applies known moment methods to construct descriptors, but the moments are generally not charge distributions, nor point sets, nor mass distributions, but are composed of other chemical characteristics convoluted (mathematical operation) with a probe function. None of the claims at issue refer to those aspects of CoMMA (discussed in Platt '294 Patent). Further, CoMMAs descriptors are applied to the construction of QSARs. The use of invariants is an advantage of the technology which may be applied to QSARs and to the construction of keys for rapid retrieval. However, the technique is applied to different types of data and used to different ends from the present invention. Arguing that they are the same because they use invariant eigenvalues and eigenvectors of quadratic moments would be equivalent to arguing that transistors should be not be patentable over diodes because they use the same depletion layers that made diodes work, or that computers not be patented over calculating machines because they add numbers, which mechanical calculating machines had previously done. CoMMA descriptors apply to entire molecules; the claims of this patent apply to parts of molecules. The word "storage" as applied in either patent also requires qualification by context: CoMMA values are "stored" in short-term memory; the keys computed from these descriptors are used as keys pointing to data describing entire molecules stored in long-term (disk) storage. In the CoMMA case, the storage is for immediate use and computation; for this patent, the organization of stored information is the point of the effort. Peaches and tennis balls are round and fuzzy – but that does not mean that they are the same.

Applicant : Michael C. Pitman
Serial No. : 09/275,568
Filed : March 24, 1999
Page : 14 of 21

Attorney's Docket No.: YOR919980112US1

Finally, the Examiner has erred as a matter of law by arguing that a type of data structure allegedly disclosed in Platt "is consistent with" the limitation of "key indexes to entry for retrieval thereof." The legal test for anticipation is whether every element of a claim is found in an item of prior art, and not whether a structure is consistent with a claimed method. Therefore, appellants request reversal of the rejections under Section 102(e).

The brief fee of \$500 is enclosed. Please apply any other charges or credits to Deposit Account No. 50-0510.

Respectfully submitted,

Date: Dec. 5, 2005

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Claims Appendix

1. A method in a data processing system for generating and storing in a database an entry, the method comprising the steps of:

generating an entry comprising:

i) data identifying a molecule;

ii) data identifying at least one region in the molecule; and

iii) a set of axes derived from property distribution information of the at least one region, the set of axes characterizing the at least one region;

generating at least one descriptor vector for the at least one region;

applying a mapping to the at least one descriptor vector associated with the at least one region to construct a key based on preselected criteria; and

storing the entry in a memory, wherein the key is associated with the entry such that the key indexes the entry for retrieval thereof.

4. The method of claim 1, wherein the property distribution information of the at least one region is computed from a convolution with a probe function to a property field.

5. The method of claim 1, wherein the at least one descriptor vectors is classified into groups, and wherein the mapping step maps the at least one descriptor vectors to a space discriminating between groups of descriptor vectors.

6. The method of claim 5, wherein the mapping is derived from the steps of:

generating first data representing differences between groups of descriptor vectors;

generating second data representing variations within groups of descriptor vectors;

identifying a set of component vectors that maximizes a ratio of variations between groups to the variations within groups along the component vectors as a discriminant criterion function;

generating a criterion function for subsets of the component vectors, wherein the criterion function utilizes the first data and the second data;

for each particular subset of component vectors, calculating a probability value for the criterion functions associated with the particular subset;

selecting a probability value from probability values for the subsets of component vectors based upon a predetermined criterion;

identifying the subset of component vectors associated with the selected probability value; and

generating a mapping to a space corresponding to the subset of component vectors associated with the selected probability value, and storing the mapping for subsequent processing.

7. The method of claim 6, wherein the first data comprises a matrix ϵ_b representing covariance between the groups of descriptor vectors, and the second data comprises a matrix ϵ_w representing covariance within the groups of descriptor vectors.

8. The method of claim 7, wherein the criterion function has the general form:

$$f(\hat{w}) = C \left(\frac{\hat{w}^T \epsilon_b \hat{w}}{\hat{w}^T \epsilon_w \hat{w}} \right)$$

where \hat{w} is some vector, T indicates a transpose, ϵ_b is a first data representing covariance, ϵ_w is a second data representing covariance and C is a constant based upon degrees of freedom in ϵ_b and ϵ_w .

9. The method of claim 8, wherein the variable C is determined as follows:

$$C = \frac{1/\text{degrees of freedom in } \epsilon_b}{1/\text{degrees of freedom in } \epsilon_w} = \frac{1/(N-1)}{1/(\sum n_i - N)}$$

where N represents the number of groups of descriptor vectors, n_i represents the number of regions, and $\sum n_i$ represents the sum of n_i for the N groups.

10. The method of claim 7, wherein the step of identifying a set of component vectors that maximizes an F-distributed criterion function comprises the substeps of:

determining a set of (eigenvalue, eigenvector) pairs for the matrix ϵ_w ; and

determining the set of component vectors based upon the set of (eigenvalue, eigenvector) pairs for the matrix ϵ_w .

11. The method of claim 10, wherein the F-distributed statistic for a given subset of component vectors is based upon value of the criterion function for the subset of component vectors.

12. The method of claim 11, wherein the F-distributed statistic for a given subset of component vectors has the following form:

$$\Psi_s = C \left(\frac{1}{L_s} \right) \sum f_k$$

where f_k represents the value of the criterion function at a component vector in the given subset, C is a constant, L_s represents the number of f_k values in the given subset of component vectors, and the \sum operation sums over the L_s f_k values in the given subset of component vectors.

13. The method of claim 12, wherein the probability value for a particular F-distributed statistic represents a probability value that the particular F-distributed statistic could have been larger by chance.

14. The method of claim 13, wherein the probability value selected from probability values for the subsets of component vectors is a minimum probability value of the probability values for the subsets of component vectors.

15. The method of claim 6, wherein the mapping for the at least one descriptor vector performs a loop over each component vector belonging to the subset of component vectors associated with the selected probability;

wherein, in each iteration of the loop, dot product of the descriptor vector with a transpose of a unit vector for the given component vector is added to a running sum.

31. The method of claim 1, wherein the at least one descriptor vector is invariant to rotation and translation of the at least one region.

32. The method of claim 31, wherein the set of axes is derived from principal axes of second moments of a region of the property distribution information.

33. The method of claim 6, wherein the probability value is obtained by treating the ratio as an F-distributed statistic.

34. The method of claim 6, wherein the probability value is obtained by any one of cross-validation, jack-knife and bootstrap estimations.

Applicant : Michael C. Pitman
Serial No. : 09/275,568
Filed : March 24, 1999
Page : 19 of 21

Attorney's Docket No.: YOR919980112US1

35. The method of claim 6, wherein application in constructing the discriminant criterion function includes boosting and bagging techniques.

Applicant : Michael C. Pitman
Serial No. : 09/275,568
Filed : March 24, 1999
Page : 20 of 21

Attorney's Docket No.: YOR919980112US1

Evidence Appendix.

U. S. Patent No. 5,784,294 (attached).

Applicant : Michael C. Pitman
Serial No. : 09/275,568
Filed : March 24, 1999
Page : 21 of 21

Attorney's Docket No.: YOR919980112US1

Related Proceedings Appendix.

None.

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